

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
16 November 2006 (16.11.2006)

PCT

(10) International Publication Number
WO 2006/121842 A3

(51) International Patent Classification:
A61N 1/365 (2006.01)

M. [US/US]; 9069 Cambridge Road, Woodbury, Minnesota 55125 (US). SPINELLI, Julio C. [US/US]; 5612 Chatsworth Street, Shoreview, Minnesota 55126 (US).

(21) International Application Number:
PCT/US2006/017384

(74) Agents: CLISE, Timothy B. et al.; Schwegman, Lundberg, Woessner & Kluth, P.a.ll.p.o. Box 2938, Minneapolis, Minnesota 55402 (US).

(22) International Filing Date: 5 May 2006 (05.05.2006)

(25) Filing Language: English

(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(26) Publication Language: English

(30) Priority Data:
60/678,338 6 May 2005 (06.05.2005) US
11/151,015 13 June 2005 (13.06.2005) US

(71) Applicant (*for all designated States except US*): CARDIAC PACEMAKERS, INC. [US/US]; 4100 Hamline Avenue North, St. Paul, Minnesota 55112-5798 (US).

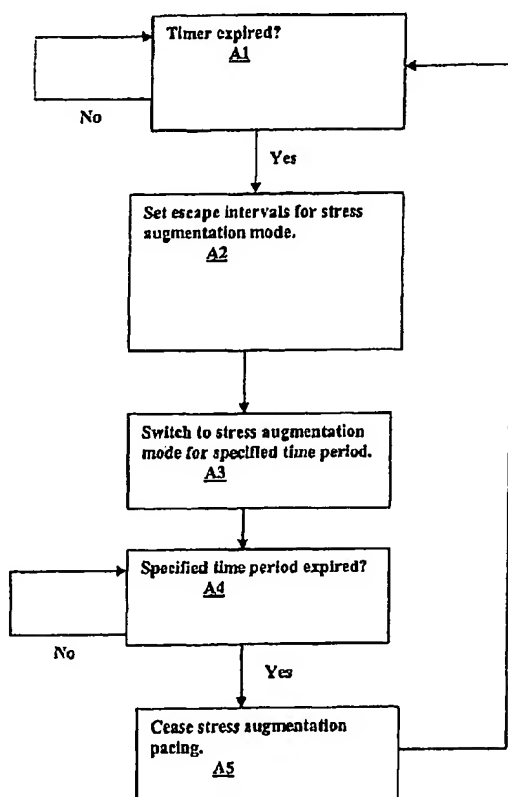
(72) Inventors; and

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,

(75) Inventors/Applicants (*for US only*): PASTORE, Joseph,

[Continued on next page]

(54) Title: CONTROLLED INTERMITTENT STRESS AUGMENTATION PACING



(57) Abstract: A device and method for delivering electrical stimulation to the heart in a manner which provides a protective effect against subsequent ischemia is disclosed. The protective effect is produced by configuring a cardiac pacing device to intermittently switch from a normal operating mode to a stress augmentation mode in which the spatial pattern of depolarization is varied to thereby subject a particular region or regions of the ventricular myocardium to increased mechanical stress.

WO 2006/121842 A3



ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT,
RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA,
GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

(88) Date of publication of the international search report:

19 April 2007

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2006/017384

A. CLASSIFICATION OF SUBJECT MATTER INV. A61N1/365		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) A61N		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, PAJ, WPI Data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 437 159 A (PACESETTER INC [US]) 14 July 2004 (2004-07-14) abstract; figures 2,3 paragraphs [0003], [0052]	1-13
Y		16-19
X	US 6 238 422 B1 (VAN OORT GEESKE [NL]) 29 May 2001 (2001-05-29) abstract; figure 5 column 2, line 30 - column 3, line 13 column 3, line 42 - column 6, line 55	1,2
Y		3,6
X	US 2002/128563 A1 (CARLSON GERRARD M [US] ET AL) 12 September 2002 (2002-09-12) abstract; figure 1 paragraph [0043]	14,15
Y		16-19
----- -/-		
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents : *A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *&* document member of the same patent family		
Date of the actual completion of the international search		Date of mailing of the international search report
12 January 2007		23/01/2007
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer Wetzig, Thomas

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2006/017384

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2004/093034 A1 (GIROUARD STEVEN D [US] ET AL) 13 May 2004 (2004-05-13) abstract; claims 1,8 -----	14,16,19
Y	US 6 865 420 B1 (KROLL MARK W [US]) 8 March 2005 (2005-03-08) abstract column 3, line 3 - line 11 -----	3,6,14, 16,19
E	WO 2006/079010 A (MEDTRONIC INC [US]; ROUW MATTIAS [NL]; BOUTE WILLEM [NL]; VAN DAM PETE) 27 July 2006 (2006-07-27) the whole document -----	1-13

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2006/017384

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1437159	A	14-07-2004	US 2004138716 A1	15-07-2004
US 6238422	B1	29-05-2001	NONE	
US 2002128563	A1	12-09-2002	EP 1365836 A2	03-12-2003
			WO 02072196 A2	19-09-2002
			US 2004193066 A1	30-09-2004
			US 2002128564 A1	12-09-2002
US 2004093034	A1	13-05-2004	AU 2003287734 A1	03-06-2004
			EP 1560615 A1	10-08-2005
			JP 2006506130 T	23-02-2006
			WO 2004043522 A1	27-05-2004
			US 2006247686 A1	02-11-2006
US 6865420	B1	08-03-2005	NONE	
WO 2006079010	A	27-07-2006	US 2006167513 A1	27-07-2006